

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Original) A steering control apparatus for an automotive vehicle, comprising:
 - a camera photographing a travel path in a traveling direction of a vehicle;
 - a lateral displacement calculating circuit that calculates a lateral displacement of the vehicle with respect to the travel path according to an image of the travel path photographed by the camera;
 - a differentiator that calculates a differential value of the lateral displacement;
 - a vehicle speed sensor that detects a vehicle speed;
 - a relative yaw rate calculating section that calculates a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed;
 - an actuator that provides an assistance force for the steering mechanism; and
 - an actuator controlling section that drivingly controls the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the relative yaw rate.
2. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 1, wherein the lateral displacement calculating circuit comprises: a white line recognition circuit that recognizes white lines located on both ends of the traveling path; a center position calculating circuit which calculates a center position between both ends of the travel path; and a deviation quantity calculating circuit that calculates a lateral displacement of the vehicle with respect to the center position of the travel path.
3. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 2, wherein the white line recognition circuit recognizes the white lines a predetermined distance ahead of the vehicle and the deviation quantity calculating section calculates a variation rate of a relative angle between the center position of the white line and the vehicle.

4. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 1, wherein the steering control apparatus further comprises a steering torque sensor that detects a steering torque applied to the steering mechanism and the actuator controlling section drivingly controls the actuator on the basis of the relative yaw rate and the steering torque.

5. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 1, wherein the differentiator comprises a filter processing circuit.

6. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 1, wherein the actuator controlling section outputs a steering torque command value to the actuator, the steering torque command value being a sum of a steering assistance quantity calculated on the basis of a steering torque and the vehicle speed and a stability direction steering quantity calculated on the basis of the calculated relative yaw rate.

7. (Currently Amended) A steering control apparatus for an automotive vehicle as claimed in claim 6, vehicle, comprising:

a camera photographing a travel path in a traveling direction of a vehicle;
a lateral displacement calculating circuit that calculates a lateral displacement of the vehicle with respect to the travel path according to an image of the travel path photographed by the camera;
a differentiator that calculates a differential value of the lateral displacement;
a vehicle speed sensor that detects a vehicle speed;
a relative yaw rate calculating section that calculates a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed;
an actuator that provides an assistance force for the steering mechanism; and
an actuator controlling section that drivingly controls the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the relative yaw rate,

wherein the actuator controlling section outputs a steering torque command value to the actuator, the steering torque command value being a sum of a steering assistance quantity calculated on the basis of a steering torque and the vehicle speed and a stability direction steering quantity calculated on the basis of the calculated relative yaw rate, and

wherein the actuator controlling section comprises a relative yaw rate controlling section comprising:

a differentiator that differentiates the lateral displacement;
a pseudo differentiation filter constituted by a predetermined forward distance (L) and the vehicle speed; and
a control gain section that provides a control gain in the direction toward which the relative yaw rate extracted from the pseudo differentiation filter is cancelled and outputs the stability direction steering quantity.

8. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 7, wherein the actuator controlling section comprises a steering assistance controlling section that calculates the steering assistance quantity on the basis of a steering torque and the vehicle speed.

9. (Original) A steering control apparatus for an automotive vehicle as claimed in claim 8, wherein the actuator comprises an electrically driven motor of a power steering mechanism of the vehicle.

10. (Original) A steering control method for an automotive vehicle, comprising:
photographing a travel path in a traveling direction of a vehicle using a camera;
calculating a lateral displacement of the vehicle with respect to the travel path according to an image of the travel path photographed by the camera;
calculating a differential value of the lateral displacement;
detecting a vehicle speed;
calculating a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed;
providing a steering assistance force for the steering mechanism using an actuator;
and
drivingly controlling the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the relative yaw rate.

AMENDMENTS TO THE ABSTRACT

Please amend the Abstract as follows:

[0038]—In a steering control apparatus and method for an automotive vehicle, a camera photographs a travel path in a traveling direction of a vehicle, a lateral displacement calculating circuit calculates a lateral displacement of the vehicle with respect to the travel path according to an image of the travel path photographed by the camera, a differentiator calculates a differential value of the lateral displacement, a vehicle speed sensor that detects detects a vehicle speed, a relative yaw rate calculating section calculates a relative yaw rate with respect to the travel path of the vehicle on the basis of the lateral displacement, the differential value of the lateral displacement, and the vehicle speed, an actuator provides an assistance force for the steering mechanism, and an actuator controlling section drivingly controls the actuator in a direction toward which the relative yaw rate is cancelled on the basis of the relative yaw rate.